

Interactive comment on “Automated object-based classification of rain-induced landslides with VHR multispectral images in Madeira Island” by S. Heleno et al.

Anonymous Referee #2

Received and published: 30 October 2015

The authors describe an object-based approach for detecting landslides and separating source from run-out areas based on a GeoEye-1 satellite image supported by a pre-event LiDAR DEM. They use a SVM classifier within the ENVI feature extraction module to perform segmentation and classification. The topic is very interesting. However, there are several issues that need to be clarified. A thorough revision is needed.

General comments:

Using the term “automated” for the presented approach is exaggerated. Semi-automated seems to be more realistic; also in the title. Please be consistent when

C2158

using specific terms: Sometimes “semi-“ is used, sometimes not. At one time the authors use “automated” and at another time they use “automatic”.

The Introduction section might be slightly improved/restructured to make it more readable. For example, why do the authors talk about change detection in one paragraph? Change detection is not done here and thus, not really relevant for this manuscript.

The differentiation of source and run-out is a good idea, but I am not fully convinced about the way how this was done. A more detailed discussion is needed. It seems that the source areas (or what was treated as source areas) appear darker on the image. I am wondering why this is the case? Was this spectral difference the primary driver for the differentiation? The process should be described in a clearer and more structured way. Maybe I missed it, but which main features were the most relevant ones therefore? The authors also mention that they differentiate debris flows into source and run-out, which is questionable for me (for details see my comment below). But no information about that is given in the Methods or Results section. Neither debris flows are shown in the Figures. To address all yellow areas in Figure 7 as run-out is also questionable; at least this needs more discussion. Furthermore, the authors also state that the source areas were divided into primary and secondary sources, but I do not fully understand how and why this was done.

Specific comments:

Page 5636, line 12: “Panchromatic” should be replaced with “multispectral” since you talk about Ikonos, QB, etc. and the “best” option for landslide mapping.

Page 5636, line 12 and 13: it should be “QuickBird”, GeoEye” and “WorldView”. Please be consistent throughout the manuscript.

Page 5636, line 17: No landslide events are mapped, only landslides are mapped. So, it should be changed to “... to map landslides on...”.

Page 5639, line 6 ff: What does “pixel-1” mean? Why not just writing “2m spatial

C2159

resolution” instead of “2.0m pixel-1”?

Page 5639, line 18: Change to “visual interpretation of orthophotos” (check in the whole manuscript).

Page 6540, line 1 and 2: I don’t understand the part: “. . .run-out areas were mapped separately inside the disturbed region, both for the shallow translational type of slides and debris flows”. Do you mean that also debris flows were separated into source and run-out? Shouldn’t a debris flow rather correspond to run-out areas? Please explain and rephrase.

Page 5640, line 15 and 16: Was there a shift between panchromatic and multispectral images so that co-registration was necessary before pan-sharpening?

Page 5642, line 2 and 3: Please mention how the comparison was done. I assume it was based on visual interpretation or did you apply any statistical calculations?

Page 5647, line24 ff: Please go back to literature and check again. I believe there is the one or other paper where the differentiation of source and transportation area or landslides from debris flows/run-outs with OBIA is tackled at least to some degree.

Technical corrections:

English language needs to be carefully improved (including punctuation and minor errors).

Please check the ordering of references when citing more than one reference in the text (alphabetically or by date, etc.).

Figure 2: Why is the figure shown in greyscale?

Figure 4: The caption should be revised. The segmentation parameters are not shown, rather the resulting segments.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 5633, 2015.

C2160